

**CLAIMS**

1. A dressing for treating damaged tissue, the dressing incorporating:
  - a pair of electrodes; and
  - a conductive gel between the electrodes,5 such that, in use, an electric current passes between the electrodes through the gel to repair the damaged tissue.
2. A dressing according to claim 1, wherein the dressing further incorporates a holder for supporting a control unit, the holder comprising means for connecting the 10 control unit to the electrodes.
3. A dressing according to claim 1, wherein the dressing further incorporates a control unit connected to the electrodes.
- 15 4. A dressing according to any one of the preceding claims, further comprising pockets in the surface adapted to hold the gel, such that the gel is forced out of the pockets onto the treatment area when the dressing is applied to the treatment area.
5. A dressing according to any one of the preceding claims, wherein the gel is a 20 conductive hydropolymer containing at least one type of a plurality of treatment molecules which are released when an electrical current from the electrodes passes through the gel.
- 25 6. A dressing according to claim 5, wherein the treatment molecules are oxygen molecules.
7. A dressing for treating damaged tissue, the dressing incorporating:
  - a pair of electrodes;
  - a sensor for detecting an environmental parameter on the damaged tissue,30 such that, in use, an electric current passes between the electrodes through the gel to repair the damaged tissue in accordance with the detected parameter.

8. A dressing according to claim 7, wherein the dressing further incorporates a holder for supporting a control unit, the holder comprising means for connecting the control unit to the electrodes and the sensor.

5 9. A dressing according to claim 8, wherein the connecting means comprises:  
a pair of contact electrodes in the holder; and  
a pair of wires embedded in the dressing, each wire connecting one of the contact electrodes to one of the pair of electrodes.

10 10. A dressing according to claim 7, wherein the dressing further incorporates a control unit connected to the electrodes and the sensor.

11. A dressing according to any one of claims 7 to 10, wherein the sensor is adapted to produce a signal indicative of the environmental parameter.

15 12. A dressing according to any one of claims 7 to 11, wherein the environmental parameter is one of an oxygen, pH, bacterial infection or temperature level.

13. A dressing according to any one of the preceding claims, wherein the electrodes are formed from carbon fibre.

20 14. A dressing according to any one of the preceding claims, wherein each electrode is formed from a plurality of subsidiary electrodes connected to each other.

25 15. A dressing according to any one of the preceding claims, further comprising:  
interlinked air pockets in the surface; and  
a valve linked to the air pockets,  
such that when the dressing is fixed to a treatment area, air supplied to the valve causes the pockets to expand and tighten the dressing against the treatment area.

30 16. A control unit for use with the dressing of any one of the preceding claims, comprising:  
a housing;  
electronic circuitry in the housing;

output electrodes connected to the electronic circuitry.

17. A control unit according to claim 16, wherein the electronic circuitry comprises memory storing at least one programme for determining the amplitude, frequency and waveform of alternating current supplied to the output electrodes.

18. A control unit according to claim 16 or claim 17, wherein the control unit further comprises an i/o port connected to the electronic circuitry, such that an external device can connect to the control unit via the i/o port and update the memory and control operation of the control unit.

19. A control unit according to any one of claims 16 to 18, wherein the control unit further comprises a wireless transceiver connected to the electronic circuitry, such that an external device can wirelessly connect to the control unit via the i/o port and update the memory and control operation of the control unit.

20. A control unit according to any one of claims 16 to 19, wherein the control unit comprises:

a pair of activation electrodes; and

20 a removable tab including a metallic strip connecting the activation electrodes, wherein the electronic circuitry detects when a current can pass between the activation electrodes and only supplies current to the output electrodes when the tab is removed such that no current passes between the activation electrodes.

25 21. A device for treating damaged tissue, comprising:

a dressing for applying to a treatment area;

a pair of electrodes affixed to a treatment surface of the dressing;

a conductive gel applied to a section of the treatment surface; and

a control unit connected to the electrodes and adapted to pass electrical current

30 to the treatment area via the electrodes.

22. A device according to claim 21, further comprising a mesh overlaid on the conductive gel.

23. A device according to claim 17 or claim 22, wherein the gel is a conductive hyropolymer containing at least one type of a plurality of activators which are released when an electrical current from the electrodes passes through the gel.

5 24. A device according to any one of claims 21 to 23, wherein the activators are oxygen molecules.

25. A device for treating damaged tissue, comprising:  
a dressing for applying to a treatment area;  
10 a pair of electrodes affixed to a treatment surface of the dressing;  
a sensor attached to the dressing for detecting an environmental parameter at the treatment area; and  
a control unit connected to the electrodes and the sensor and adapted to pass electrical current to the treatment area via the electrodes according to the detected  
15 parameter.

26. A device according to claim 25, wherein the control unit is attached to the dressing and the sensor is integral with the control unit.

20 27. A device according to claim 21 or claim 26, wherein the sensor is adapted to produce a signal indicative of the environmental parameter and the control unit supplies current through the electrodes in accordance with the signal.

25 28. A device according to any one of claims 25 to 27, wherein the environmental parameter is one of an oxygen, pH, bacterial infection or temperature level.

29. A device for treating damaged tissue, comprising:  
a dressing for applying to a treatment area;  
a pair of electrodes affixed to a treatment surface of the dressing;  
30 a control unit connected to the electrodes and adapted to pass alternating current to the treatment area via the electrodes,  
wherein the control unit constantly varies the amplitude and/or the frequency of the alternating current.

30. A device according to claim 29, wherein the alternating current is varied between 50 and 500 microamps.

31. A device according to claim 29 or claim 30, wherein the frequency of the 5 alternating current is varied between 10 and 900 hertz.

32. A device according to any one of claims 29 to 31, wherein the time period between each variation of amplitude and/or frequency is 0.1s.

10 33. A device according to any one of claims 29 to 32, wherein the alternating current has a ramp waveform.

34. A device according to any one of claims 21 to 33, wherein the control unit is etched into the substrate.

15 35. A device according to any one of claims 21 to 34, wherein the control unit comprises:  
a housing;  
electronic circuitry in the housing;  
20 output electrodes connected to the electronic circuitry.

36. A device according to any one of claims 21 to 35, wherein the electronic circuitry comprises memory storing at least one programme for determining the amplitude, frequency and waveform of alternating current supplied to the output 25 electrodes.

37. A device according to any one of claims 21 to 36, wherein the control unit further comprises an i/o port connected to the electronic circuitry, such that an external device can connect to the control unit via the i/o port and update the memory 30 and controlling operation of the control unit.

38. A device according to any one of claims 21 to 37, wherein the control unit further comprises a wireless transceiver connected to the electronic circuitry, such that

an external device can wirelessly connect to the control unit via the i/o port and update the memory and control operation of the control unit.

39. A device according to any one of claims 21 to 38, wherein the control unit  
5 comprises:

a pair of activation electrodes;  
a removable tab including a metallic strip connecting the activation electrodes, wherein the electronic circuitry detects when a current can pass between the activation electrodes and only supplies current to the output electrodes when the tab is  
10 removed such that no current passes between the activation electrodes.

40. A gel for use in treating damaged tissue, comprising:  
a conductive hydropolymer; and  
a plurality of treatment molecules configured to be released from the gel when  
15 an electrical current passes through the gel.

41. A gel for use in treating damaged tissue, comprising:  
a conductive hydrocolloid; and  
a plurality of treatment molecules configured to be released from the gel when  
20 an electrical current passes through the gel.

42. A gel according to claim 40 or claim 41, wherein the treatment molecules are oxygen molecules.

25 43. A gel according to any one of claims 40 to 42, further comprising ascorbic acid.

44. A dressing, substantially as hereinbefore described with reference to the accompanying drawings.

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45. A control unit, substantially as hereinbefore described with reference to the accompanying drawings.

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46. A device, substantially as hereinbefore described with reference to the accompanying drawings.

47. A gel, substantially as hereinbefore described with reference to the

5 accompanying drawings.